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Twilight Sleep

and

How to Induce It

aining the Method Employed by Krœnig and Gauss, at Freiburg, Germany

Including Additional Articles on

Painless Labor

And How to Prepare for It

Explaining Further Expert Methods of Preparing Women During Pregnancy for Painless Childbirth, etc.

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The American Journal of Clinical Medicine

Introduction

Great interest has been aroused among the lay population of the United States, and especially among its women, by the publication of several articles in popular magazines regarding the method of inducing painless labor—or the "twilight sleep" as it has been called—practised by two German professors, Gauss and Kroenig, of the University of Freiburg, Germany. Probably no medical subject has been so freely discussed in the newspapers within recent years. The method has been praised by many, and condemned by many others; but it is significant that the condemnation has come almost exclusively from the medical profession, or at least from a portion of it. It is very clear that all women are intensely anxious to secure relief from that primal curse of their sex, "In sorrow thou shalt bring forth children."

If this year's experience can teach the physician anything, it should be the importance of preserving his child-bearing women-patrons from unnecessary suffering. That they long for relief—yearn for it—and for lack of it, refuse to undergo the pangs of childbirth, every doctor should know by this time. Once they are convinced that they can safely go through labor without great suffering, few women will consent to be confined in the old-fashioned way. They will demand relief, and they will get it. Every physician should think of this before rising too quickly to condemn the new obstetrical ideas which have recently been exploited with such enthusiasm. Possibly the enthusiasm has been too intense, but certainly the methods suggested are of enough importance to deserve careful and unbiased consideration.

That much can be done to put the pregnant woman in good condition to go through her confinement, and to reduce the pain of this ordeal, many are convinced. Yet most doctors hardly know how to respond to the inquiry of the young woman who asks: "Doctor, isn't there something I can do to prepare myself, so I won't suffer so much?" Too many doctors, when asked this question, stammer out a few general and unconvincing suggestions regarding diet, exercise, and laxatives. But they have no system.

But to return to "Twilight Sleep." It is not generally known, even by medical men, that the "Twilight Sleep," or *Daemmerschlaf,* now introduced in America as something "new" has been practised in Freiburg, and elsewhere, for nearly a decade. The first authentic and complete description of the method printed in America appeared in *The American Journal of Clinical Medicine,* in May, 1907. It was written by Dr. William L. Holt, an American physician residing in Freiburg, and personally conversant with all the details of the work of Gauss and Kroenig. His description of the technic employed by these gentlemen is identical with that employed to-day, and is couched in careful scientific language. We reprint the description in this book.

However, prior to the publication of Dr. Holt's paper, a similar method of inducing painless labor, in which hyoscine, morphine and cactoid were used in place of scopolamine and morphine, had been in use in this country for some

months. It has been used continuously ever since by thousands of physicians in many thousands of obstetrical cases. That the reader may be fully conversant with the technic of this method also, we are reproducing it now, together with an excellent paper by Professor William Rittenhouse, of Bennett Medical College, telling how to shorten the course of labor.

The writer knows of a man who has a real system which he insists actually gives the relief desired. I mean Dr. Finley Ellingwood, whose directions follow. Dr. Ellingwood's method of treatment can be begun early in pregnancy and carried through to its completion. It is simple, inexpensive, can be undertaken in the patient's own home, and any competent physician can direct it. Doctor Ellingwood's method of treatment is of so much importance that we have given up to it a large portion of this treatise.

It is hoped that these and the other articles published in this treatise may be of real practical value to many physicians. Taken together, they give a fund of information not obtainable elsewhere, relative to various practical methods of making the confinement relatively painless.

Twilight Sleep—and How to Induce It

Scopolamine-Morphine in Obstetrics*

By William L. Holt, M.D., Freiburg, Germany.

For the following review I am indebted for permission and kind assistance to Professor Kroenig, director of the University Women's Clinic, at Freiburg, Germany, and especially to his assistant, Dr. C. J. Gauss, who very kindly gave me the publications on the subject and also permitted me to see some women delivered under scopolamine-morphine anesthesia. I am also indebted to the editors of the medical journals (noted in the bibliography), in which the articles here reviewed appeared.

Anesthesia or half-narcosis, by means of scopolamine and morphine, was first introduced into obstetrics by von Steinbuechel. He used smaller doses, however, and obtained only partial relief from pain without any effect on the patient's memory.

Scopolamine has long been used by psychiatrists as a sedative, with excellent results; it is also used together with morphine, to a large extent, as an anesthetic for surgical and gynecological operations by Kroenig, Kuemmel, Rotter and others. But to Dr. Gauss of Freiburg belongs the credit of discovering that, by repeated injections of small doses of these two drugs, a peculiar state of half-consciousness is produced, in which the patient still perceives sensations, including pain, but retains no memory of these sensations whatever afterward. That is, Gauss first induced this peculiar psychical state, which he calls "*Daemmerschlaf,*" in women in labor, with the aim of alleviating the suffering of childbirth and removing all later memory of it.

Dr. Gauss characterizes this peculiar state of consciousness as follows: "The word *half-narcosis* does not fully express this remarkable state of consciousness. The patient is in a *state of sleep,* out of which she can be awakened or awake at any moment, but at the same time she shows amnesia, characteristic of the psychiatric *Daemmerzustand* (twilight state of consciousness) during the whole period of action of the injections." Hence he substitutes the term *Daemmerschlaf* (Twilight-Sleep), which I shall accordingly adopt in this article.

Advantages of this Method of Anesthesia

It seems in order, before going farther, to state the advantages offered by this new method of anesthesia. In the first place, it works. Not always, for many reasons to be discussed later, but still in seventy-eight per cent. of Gauss's first 300 cases. If the time suffices before delivery, the method rarely fails to accomplished the desired result.

Second, it gives such relief from the labor-pains that the women beg for more injections. But its greatest value, if time should justify Gauss's claims, lies in the later effect on the mother, namely, in preventing nervous and mental diseases by sparing her the psychic traumata of childbirth. Pregnancy, childbirth, the puerperium, and nursing are well known by psychiatrists to be the

* Reprinted from *The American Journal of Clinical Medicine,* May, 1907.

chief exciting causes of nervous and mental diseases in women. It is surely also a great service to humanity wholly to remove from women the memory of the most terrible suffering in their experience and with it the dread of having another child. My own personal experience of two cases makes me believe that this natural fear of the suffering and danger involved in childbirth is an important factor in our modern, lamented race-suicide and also in marital unhappiness. Hence the scopolamine-morphine *Daemmerschlaf* has a great sociological interest, as well as psychiatrical and obstetrical. It should be thoroughly and impartially investigated from every point of view, and if its claims are substantiated, should be accepted as a blessing in obstetrics, rivaling that of ether, and should be adopted, wherever practical, by all obstetricians.

I will state in order, and as briefly as I can, the technic of the method, its effects, if any, on the different birth-processes and the duration of labor, the usual and also the unusual effects sometimes observed on the mother and the child, the objections of the critics, together with the results of several other German obstetricians, and finally, Dr. Gauss's report of the first thousand cases of *Daemmerschlaf* at the Freiburg clinic, with his reply to criticisms, together with a detailed account of one successful case of my own observation.

Technic of the "Twilight Sleep"

Two separate sterile solutions are used: one is a 0.03 per cent. aqueous solution of Merck's (or Boehringer's) crystalline scopolaminum hydrobromicum, the other a one per cent. aqueous solution of morphine. Both should be made with sterile distilled water and kept in the dark in white glass bottles tightly corked. The solutions keep a long time without carbolic acid or other preservative; but should always be examined for turbidity or sediment before using, for such solutions are spoiled and those of scopolamine act very unreliably. Gauss uses a very delicate test for this purpose, which will be given later. With the exception of such spoiled solutions, he denies that the varying effects obtained by injecting the same amount of scopolamine into different women is due to impurity or unreliability of the preparation, and states that different results obtained with the same dose of the same preparation given at the same time show that not the drug but the individual varying susceptibility is responsible. Gauss has had somewhat better results with the scopolamine made by Boehringer of Mannheim, but Merck's from Darmstadt is also reliable.

The first injection is usually given when the pains become really severe and frequent, say every five to six minutes, and last twenty to thirty seconds. One to 1.5 cc. of scopolamine solution (0.30 to 0.45 mg.) with 1 cc. of the morphine solution (0.01) are given subcutaneously in the usual manner. About a half hour later the patient is shown a test object, *e. g.*, a pair of shears; a half hour later she is again asked whether she remembers the shears. This apparently trivial maneuver is actually of basic importance, for on these tests of the "*Merkfaehigkeit*," or capacity to perceive and to "remember" sensations, the dosage is entirely based. As test of the *Merkfaehigkeit* any definite sensation of characteristic nature which is not too often repeated serves. The injections themselves are always so used, as are all the different manipulations to which the patient is subjected, such as pelvic measurements, vaginal or rectal examinations, catheterization, etc.

Besides these test-sensations, which are not given for that purpose, special test-objects are shown the patient at regular intervals of a half to one hour, a different one each time. When the patient replies that she does not remem-

ber the object shown last, this proves that she was in *Daemmerschlaf* when this object was first shown, and no more injections are given until later tests show returning waking consciousness. But if the patient gives a positive reply to the test question or when she does later, the second injection is given, usually without morphine. This second injection, and indeed, all the later injections, are either 0.5 or 1 cc. sol. scopolamine, according to whether 0.5 cc. is found sufficient to keep the patient in *Daemmerschlaf* for two hours, or a whole cubic centimeter is found necessary. Formerly morphine was repeated with each injection, but Gauss found that so much morphine had a strongly intoxicative effect upon the child and also greatly injured the labor-pains, especially the expulsive labor-pains, and hence omitted it. Exceptions to this rule will be noted later.

[There have been a few cases reported of this apparent asphyxia of the child with the H-M-C compound, and while these have been exceedingly few and non-fatal, we do not minimize their importance. We have believed that this has been due to over-dosing with the morphine and have generally advised the use of half doses of the anesthetic—see article near close of this book—and where it has been so used no trouble has been reported. Gauss's report seems to fix definitely the responsibility upon the morphine. The second dose may, if preferred, be of hyoscine alone, with support by cactoid. Note carefully the technic employed by Gauss.—Ed.]

The Number of Injections and the Total Dosage

The number of injections required to induce *Daemmerschlaf* varies greatly. In most cases four injections at intervals of not less than one hour, and usually from two to four hours, suffice to induce *Daemmerschlaf* and to sustain it until after birth. The average total dose of scopolamine is 0.75 mg. (1-80.); but sometimes the first dose of 0.3 to 0.45 mg. suffices, and again 0.9 to 1.2 mg. may be required before *Daemmerschlaf* is obtained.

The effective dose can be diminished and so overdosing be avoided, by protecting the patient so far as possible from disturbing sights and sounds. In the Freiburg clinic the ears are plugged with antiphones, the room is kept as quiet as possible, and shortly before birth the woman's head is covered. It is most important in this connection to stifle the cries of the newborn, for if heard, the mother's imagination may construct from them the whole birth-process.

The two secrets of success in this method, besides good fresh preparations, are: (1) to start with a small dose and obtain the desired effect slowly by repeating this small dose; (2) by means of careful and repeated testing of the patient's memory-power to avoid both overdosing, with its untoward results, and also underdosing, which results in breaks in the zone of *Daemmerschlaf* and often in more or less complete remembrance of the birth.

Dr. Gauss gives the following as the most common causes of failure:

1. First and easiest is to try to force the effect by too large doses or too often repeated. This leads to many untoward results, viz.: weak pains, rapid and irregular pulse, sometimes hallucinations and excitation, failure of the abdominal muscles, and deep apnea or even asphyxia of the child.

2. The time remaining after the patient is received is often insufficient to induce *Daemmerschlaf* before the birth; hence it is wiser to promise only alleviation of the pain and not complete removal and forgetting of it.

3. To begin too early in the labor with the injections. This mistake is usually made with primiparae, who exaggerate their suffering (or are more sensitive!). Primary weak pains indeed are a positive contra-indication to scopolamine. The labor-pains must be strong, frequent and lasting, coming, say, every four to five minutes and lasting half a minute before the first injection is given. (In the case

I saw, the woman (II para) had been in labor two hours and was having pains every four to five minutes, lasting one-fourth to one-half minute, and felt severe pains in the sacrum and belly before the first injection was given.)

4. The last error is to control the dosage, not by the tests of the patient's memory-power, but by her pains and cries. The operator must know that even in true *Daemmerschlaf* the pain-cries continue regularly and also, as in other cases, become stronger toward the birth.

Effects on the Birth-Process and Duration of Labor

This may be considered under two heads: the effect on the uterine contractions, and the effect on the abdominal muscles.

With the aim of studying the effects on the uterine pains, the length and duration of each pain was noted by the hand laid upon the abdomen, and recorded.

The following figures refer to Gauss's first report on his first 500 cases. In this he reports on 493 cases, in which the uterine pains were carefully noted —in 451 no apparent effect, in eight worse, and in thirty-six better than before the injections. An assistant, Dr. Schlimpert, constructed curves of the uterine contractions in 128 cases; and from these selected those cases of deepest *Daemmerschlaf* in which the bad effect on the pains was best to be seen, *i. e.,* those cases in which the patient did not answer test-questions at all. In the eight unfavorable cases too much morphine was given, to which the weakening effect may naturally be ascribed. From these figures the conclusion seems justified that scopolamine injections rarely produce an injurious effect of practical importance on the uterine contractions. Unfortunately, in his later report, on the first thousand cases, Gauss does not give further statistics on this point. He says, however, that his birth records enable him to deny, in his clinic, the "excessive prolongation of labor" found by Hocheisen. He hopes later to establish in a dissertation the effects on the labor-pains.

The accessory action of the abdominal muscles was noted in 460 cases. In 444 they came into play spontaneously and only thirty-eight times badly. In the remaining sixteen cases, the muscles acted only when called upon, and then eight times well and eight times badly. It is rare that a birth occurs through the action of the uterus alone, the abdominal muscles normally assisting; hence their failure to work reflexly in these sixteen cases must be laid to the injections. This conclusion is strengthened by the fact that in these very cases too large amounts of the drugs were suddenly introduced. The morphine, it is well known, is especially dangerous in this respect. In the second 500 cases, Gauss obtained better results by not repeating the initial dose of morphine, except under one of two conditions: (1) severe pain, due to a generally narrow pelvis or a very large child, when 0.005 to 0.01 is given, and (2) if the patient awakes or is intentionally awakened, then the regular initial dose must be given. Schlimpert found the action of the abdominal muscles good in almost every one of 120 cases of normal *Daemmerschlaf;* but more or less bad in twenty-two out of 131 other cases where the anesthesia produced deep narcosis. Gauss gives the same rules for avoiding such undesired effects on the abdominal muscles as have been given above, namely, to start with small doses and not give any more morphine unless necessary.

The operation frequency is a good test of any retardation of labor. Of 500 cases only sixty-three came to operation, making a percentage of 12.6. This agrees closely with the figure 12.8 per cent., reported by Von Ploeger from the Berlin university clinic.

Duration of Labor

It must be remembered in considering this point that only sixty-six per cent. of Gauss's births (in *Daemmerschlaf*) here reported were simple head presentations, while the figures of Veit and Bumm (both without scopolamine) are all based on simple head presentations.

AVERAGE LENGTH OF LABOR

	Primiparae	Multiparae	Both Togeher
128 cases in Freiburg Clinic	18° 23′	13° 58′	16° 11′
Veit's averages	19½°-20°	12°-15°	14° 36′
Bumm's averages	15°	10°	12° 30′

° = hours
′ = minutes

This comparison does not indicate that the scopolamine-morphine anesthesia delays the labor to any important extent, if at all. The duration of the second stage in ninety-three cases of deep narcosis was for primiparæ 3 hours and 27 minutes, multiparæ 1 hour and 47 minutes. Veit's corresponding figures are 1 hour and 45 minutes, and 1 hour, and Bumm's are 1 hour and 30 minutes, and 45 minutes, which would seem to show a great prolonging of this stage of labor; but as the total duration of labor in all three was very similar, it seems likely that the differences in the second stage may be explained by different points being taken for the beginning. Considerable allowance must also be made for the fact that too much morphine was given to these cases and that only two-thirds were simple cases. Moreover, to meet still persisting objectors, Gauss adds that if the labor is being apparently delayed in any case by weakening of the abdominal muscles, the effect of the scopolamine may be gotten rid of by omitting further injections, in which case the woman will come out of the *Daemmerschlaf* in a few hours. A slight delay in the birth is not often in itself a serious evil in any case, and so much the less in *Daemmerschlaf,* since the woman's suffering is relieved and afterwards wholly forgotten.

Only a word need be said about the duration of the third stage. It is not prolonged. Of the first 500 cases, in 280 the placenta came spontaneously and in 215 by simple pressure or by Credé's method. In only three was manual extraction necessary, a percentage of 0.6, which compares favorably with those of other authors running from 0.3 to 7.3. The time-periods elapsing between the child and the placenta were as follows: 205 within a half hour; 132 in one hour; only forty-seven over two hours.

Untoward Effects on Mother or Child

Dr. Gauss gives these points very careful consideration, both before and after birth, until his cases were discharged. Of course, the future health of the children could not well be followed; and, unfortunately, his patients were discharged at the end of the first week, so that the involution of the uterus also could not be well determined. He begins with a consideration of the subjective effects on the mother. Scopolamine tends to diminish the secretions of the mucous membranes, and so the women often complain of thirst. With large doses and sensitive patients this may give much trouble; but Gauss has never failed to overcome it by giving plenty of fluids, and has never seen any bad results. He had no vomiting, unless it had already occurred before the injections. Dizziness was rarely complained of, and headache, diarrhea or constipation almost never.

Hallucinations of sight and hearing sometimes occur. The patient may see all things black or carry on a conversation with an imaginary person.

Delusions of the imagination also are noticed occasionally. They occur only in unintentionally deep narcosis, are not kept in memory, and do not disturb the patient.

Objective Effects on Mother

I have already spoken of the effect on the functions and duration of labor. What is the effect, if any, on the heart, lungs and kidneys? In his first essay, reporting the first 500 births under the *Daemmerschlaf,* Gauss says nothing about the *effect on the heart;* but later, in his report on the first thousand cases, he says in reply to Hocheisen's charges that the method is dangerous to the heart, that in his second 500 cases there were twenty-three women with heart disease, and not one had a cardiac attack. It is undeniable, however, that scopolamine does affect the heart, sometimes causing alarming rapidity and irregularity of the pulse. A woman whom I saw delivered under *Daemmerschlaf,* and whose pulse had risen gradually from 68 at 4 p. m. to 88 at 8 p. m., had an attack of tachycardia about 10 p. m., in which her pulse was very irregular and showed the following variations from 10 to 10.23: 100, 106, 92, and very irregular, 96 and regular, 114, and a minute later 70! Dr. Gauss said he had rarely seen so irregular a pulse in *Daemmerschlaf,* and supposed the woman had had too much scopolamine. The record of the control-tests confirmed his supposition; it showed that in fact more scopolamine than was necessary for the *Daemmerschlaf* had been given, due to the mistake of the nurse. Gauss was not at all alarmed, however. The woman had no heart disease; but, for that matter, he does not hesitate to give scopolamine to cardiac cases, and his experience with them surely justifies his confidence.

[The action recorded by Dr. Holt certainly justifies the addition of a cardiac tonic, such as cactoid, which obviates the danger of accidents of this kind. The cactoid strengthens and steadies the heart, and is a general vascular toner. Its action is admirable in every way and greatly adds to the value and safety of the anesthetic.—Ed.]

Effect on the kidneys.—In fifty cases, the urine was examined before the injections and again twenty-four hours after the birth. In only two cases was the later specimen found albuminous and the first not. Three had albumin at the first examination and not at the second, and the rest neither before nor after. In 100 cases more, the urine was tested at the birth and later at the time of discharge. Of these twelve had albumin at the first examination and not later; three had albumin at both times; and one no albumin at the first but albumin at the later test. Gauss supposes that the three cases of puerperal albuminuria were not due to the scopolamine but were transitory recurrences of the albuminuria of pregnancy. In any case, the result is favorable to the method.

Eclampsia.—The relation of scopolamine to eclampsia is important here. Three cases occurred in Gauss's first 500, of which two were puerperal; the third had two attacks before the *Daemmerschlaf* and only one after it. Of the seven cases which have occurred in Baden (the duchy including Freiburg) in the last year and a half only these three cases, and one other without *Daemmerschlaf,* have recovered, a fact which suggests a possible good effect of the scopolamine. The hope that scopolamine might prevent eclampsia has, however, not been realized. It certainly reduces the excitability.

Effect on the Puerperium.—As scopolamine diminishes the secretions, it might naturally be feared that lactation would be interfered with. Gauss studied this in 200 cases, and compared them with 200 other cases delivered without scopolamine during the same period. The results are best presented in the following table:

	Birth with Scopolamine	Without Scopolamine
Nursed independently	134	137
Nursed with extra feeding	15	8
Could not nurse at all	51	55
Total able to nurse	149	145

The result is certainly favorable to the method.

The involution of the uterus, unfortunately, could not be followed, as most of the women had to be discharged on the seventh day.

Effect of Anesthetic on the Child

Here must be considered separately: effects *in utero,* effects seen immediately after birth or during the first few days, and also later effects, so far as it is possible to trace any. Gauss declares that scopolamine does the child no inury whatever, in utero, but admits that one of five still-born children which he had, died indirectly because of the *Daemmerschlaf.* To quote his own words about this: " I was occupied with the manual extraction of a placenta while the breech presentation, watched by a nurse pupil—although badly watched—proceeded in an adjacent bed. Since the woman was in scopolamine-morphine *Daemmerschlaf,* she did not notice the unexpected quick birth; I myself first made the extremely unpleasant discovery on turning back the bed-covers that the child which was certainly still alive when I began to disinfect my hands lay dead and half-born between its mothers thighs." This accident strongly emphasizes the fact that a birth under scopolamine-morphine is dangerous and requires much more careful watching than one without. It seems to me to prove the method not safe for large hospitals where each case cannot have the constant supervision of a reliable nurse or physician or for private practice except under the same stringent conditions.

Children born in *Daemmerschlaf* often show a peculiar state of intoxication which is undoubtedly due to the drugs used. It is most often seen when the morphine has been given repeatedly, but may also be caused by the scopolamine alone when too much is given. A child born very soon (within ten to thirty minutes) after an injection of scopolamine is often oligopneic, and oftener when the scopolamine is overdosed. Gauss terms the state oligopnea: the child breathes only once, then lies quiet, with shut eyes, breathing occasionally, and cyanotic, and only gradually breathing at lesser intervals until at the end of fifteen or twenty minutes, if not treated, it begins to breathe normally. Gauss gives the following interesting description: " The child opens its eyelids spontaneously, but only to let them fall again slowly as though tired. The width of the pupils varied, so that no conclusion could be drawn as to the depth of the narcotic effect. The following is characteristic of this drunken-like condition: the child reacts strongly to stimuli, but the reflex action of the muscles is often suddenly interrupted before its completion as though the carrying out of the movement were suddenly forgotten. Meanwhile, the heart-action is clearly dependent on the kind of breathing; after each breath the pulse becomes progressively slower, even to sixty beats, until the next breath, when it at once rises again to normal. This alternation continues repeatedly in ever shorter intervals until finally normal regular breath-

ing is established. After this, the child shows no further deviation from the normal."

Dr. Gauss at first resuscitated these children as though asphyxiated, but by careful experiments discovered that it was not necessary, for many children came out all right in fifteen to twenty minutes without any treatment. *Light massage of the heart is the measure recommended as most efficacious and simple.*

How to avoid oligopnea.—This may usually be done by giving only 0.3 to 0.45 mg. scopolamine with 0.01 morphine at the first injection and only 0.15 to 0.3 mg. scopolamine *without morphine* later. Of fifty mothers so treated only five had oligopneic children, and these five were necessarily given the injections too rapidly 1.2 to 1.5 mg. scopolamine in two to six hours.

Sixty-five of Gauss's first 500 children were born asphyxiated—thirteen per cent. He says that forty-seven of these were easily otherwise explained, but in eighteen no satisfactory explanation was found. He saw no evidence that they were due to scopolamine-morphine. In some cases the mother was not yet in *Daemmerschlaf* when the child was born; in all the intoxication characteristic of scopolamine was lacking. Five of these children died. Two died of aspiration pneumonia, two of cerebral injuries, one never breathed. I thought some suspicion must rest on the scopolamine in this last case, but Dr. Gauss assures me that he is certain the scopolamine was not to blame in this case, although it may have been in others. Gauss gives the following details: "I came to this case when the nurse had continually held the large fetal head back for an hour in order to save the perineum. When I noticed meconium, I was suspicious, and found a very irregular and slow fetal heart; accordingly, I let the fetal head come out at once, but found the above severe condition of the child, from which it did not recover."

Gauss had only half as many asphyxiated children in his second 500 cases, the percentage falling from 12.8 to 6.3; and the mortality was 3.5 per cent. less than during the previous ten years at the Freiburg clinic. A table of the infant mortality will be given later under the report on the first thousand births.

The opponents of the *Daemmerschlaf* have brought up the question: May not such strong drugs as morphine and scopolamine when introduced into the child's system in utero have an injurious effect weeks or even months after birth? It seems to me that it would be wholly irrational to ascribe any troubles that a child might have long after birth to the drugs instilled before his birth, which must have been excreted within the first twenty-four hours. From inquiries made among private patients Gauss has not learned of any symptoms in the children during the first year which could be laid to the *Daemmerschlaf*. Prof. Hoche, director of the *Psychiatrie Klinik* at Freiburg, says it is impossible to suppose that any later bad effects from the scopolamine-morphine anesthesia can occur in the child.

The Opposition to the "Daemmerschlaf"

Like every new discovery of importance in medicine, the scopolamine-morphine *Daemmerschlaf* has met strong opposition; and I must mention some of the objections that have been brought forward by Dr. Hocheisen, assistant to Prof. Bumm in the *Koenigliche Charite* at Berlin. He claims that scopolamine is unreliable and unsafe in general and particularly in psychiatry and surgery: "Death has been observed after doses of only one milligram. Many untoward symptoms such as dizziness, headache disturbances of sight

and hearing have followed dropping of scopolamine into the eye." Hocheisen adds several statistics showing deaths from scopolamine: one of 4,000 cases collected by Roith, with eighteen deaths, only three of which received more than one mg. Finally, he quotes a case from Toth where death followed a dose of only 0.3 mg.! Of course, similar objections could be brought against any of the alkaloids which are fatal in large doses, and rarely in ordinary doses, to persons of extraordinary susceptibility. Still, such statements, if left unanswered, would create a strong prejudice against any use of a drug which seems to be so fatal.

Gauss meets these charges as follows: He first points out that the great strength of the drug is in itself no valid objection, for one can just as easily get used to giving tenths of a milligram of scopolamine as centigrams of morphine. He then admits that scopolamine does not as yet possess the purity of most of our drugs [A point upon which we have insisted and do insist.—ED.], but quotes Prof. Kionka of Jena as saying that the preparations of Merck and Boehringer are quite pure and uniform enough to be used without any objection in medicine. He rebuts the bad results of scopolamine in psychiatry by the recent favorable report of Bumke from the *Freiburger Psychiatrie Klinik*. This report is based on abundant material, and is of great value to anyone who thinks of using scopolamine. On the average, sixteen patients were given injections daily. "The single dose rarely exceeded the maximum of 1 mg., never exceeded 2 mg., and usually was 0.5 to 1 mg. This was not because the unsafety of the drug forbade larger doses, but because its reliability made them unnecessary. No severe disturbances were seen."

He also quotes Bumke to refute Hocheisen's charge of danger to the heart. Among many thousand cases Bumke noticed no dangerous effects on the circulation. To be sure, in 55 per cent. the pulse-rate fell off 4 to 10 beats (never over twenty), and in 25 to 30 per cent. it was accelerated and then slowed, but only once, was the pulse irregular, for a time, in a high-grade arteriosclerosis. Gauss himself can point to twenty-three cardiac cases in his last 500 delivered under scopolamine, without accident. He does not consider heart disease a necessary contra-indication to the *Daemmerschlaf*.

Finally, concerning the mortality from scopolamine, Gauss declares that there is such a complete difference between the surgical scopolamine-morphine narcosis and the *Daemmerschlaf* in obstetrics that statistics on the former cannot at all be applied to the latter. So far as he can find out, all the deaths from scopolamine-morphine have occurred in full narcosis. Nevertheless, many surgeons and gynecologists—Kroenig, Kuemmel, Rotter, and Franz—use scopolamine to a great extent before giving ether or chloroform. Less ether or chloroform is needed, and the administration is made much easier for the operator and pleasanter for the patient, because the feeling of suffocation is thereby avoided.

Source of Hocheisen's Failures

I think it is not worth while to give here the results of Hocheisen, because they were obtained by a complete disregard of the fundamental principle in Dr. Gauss's method: to base the dosage solely on the repeated tests of the memory-power; and his failures offer no argument whatever against Gauss's method, but only serve to emphasize the necessity of a careful and correct technic. For Hocheisen says expressly that he omitted entirely to test the state of consciousness, "because our cases of *Daemmerschlaf* showed such

varying phenomena that out of our cases at least I cannot establish such fine (subtle) physiological-psychiatrical observations as a rule;" and accordingly he continued his injections until the patient ceased to feel the labor-pains.

Gauss controls his solutions by the following test for apoatropine (the dangerous compound probably formed in turbid solutions), which Dr. Otmar G. Kessel of the Jena Pharmacological Institute (Prof. Dr. Kionka, Director) has published

The following reports have been made on the *Daemmerschlaf* by other authors, which I have collected in the table below:

Author	Number of Cases	Dosage S—Scopolamine M—Morphine	Judgment in General	Effect on Labor Pains, Duration of Labor	Hemorrhage Postpartum	Effect on Children			
						Norm.	Oligopnea	Asphyxia	Died in Birth
Ziffer	31	0.3mg S. (1cg M.) 1-3 times	Good, safe	In 33 per cent cases were shorter and rarer. Abdom. muscles refused sometimes. 16 per cent births delayed.	1	..	..	5	1
Steinbuechel.	20	Same	Good	No unfavorable effects seen.	None reported	All	..	..	..
Wartpetian	..	0.3mg S. 1cgm M. up to 5 injections	..	..	..	Fifty per cent born "stupefied." Ascribes it to the morphine.			
Reining	36	Same	Safe	Pain well relieved 24, mod. 4, only a little 3 times. Birth often delayed.	..	Child not threatened, with careful procedure and good preparation.			
Weingarten	Over 50	Same	Good. No injury	Pain diminished in 45. Thinks it regulates pains, and accelerates the birth.	..	No injury to child.			
Hocheisen	100	Small, of scop. q.s. Total No. dose cases 0.3mg 14 0.45mg 30 0.5mg 31 0.6–0.9 21	Good result usually, but dangerous in private practice	18 neg. on pain, 21 mod. reduced, 55 excellent effect, 6 no pain at all.	5	67	18	15	1

Reports on Daemmerschlaf by other authors.

Another cause of Hocheisen's failures was doubtless the use of bad preparations. [There can be no doubt in the mind of any man who studies this

question carefully that many, if not most, of the accidents are due to an inferior drug. Cheap commercial scopolamine is *not* safe.—ED.] A sample of the scopolamine solution used at Berlin was sent by him to Dr. Gauss, who tested it on ten patients. This solution was already turbid when received, and as it came promptly, it is fair to presume it was so when used in the Berlin clinic. As Gauss expected, it had untoward effects, being strongly narcotic and also causing the following bad results: one case of deep coma, with injury to uterine and abdominal contractions; three severe postpartum hemorrages, and one deeply asphyxiated child; strong excitation four times; vertigo once, and vomiting once. Gauss, Bumke, and Kionka all warn against the use of any but clear, fresh solutions of scopolamine.

A drop of a dilute solution of potassium permanganate will in the presence of even a very slight trace of apoatropine give a brownish-yellow color, due to the precipitation of manganese. This seems to me a simple and valuable test.

Gauss's Report of a Thousand Cases of Daemmerschlaf

I have anticipated a great deal of this, but will mention the most important points not yet given.

All remarks, unless otherwise noted, will apply to the entire thousand cases. *Not a single woman died in such a way that the blame could be laid upon the method.* Only one death occurred in the second 500, and that was due to rupture of the uterus.

Hemorrhage.—In reply to Hocheisen's charges that the scopolamine-morphine injections increase danger of post-partum hemorrhage, Gauss measured the blood lost in the third stage in 363 successive cases with the following satisfactory result, classification being after von Winckel

	Loss of Blood	No. of Cases	Percentage	Average am't lost
Physiological	0- 500 g.	337	92.8	190 g.
Slight	500-1000 g.	23	6.3	645 g.
Severe	1000-1500 g.	3	0.9	1255 g.
Dangerous	Over 1500 g.	0	...	....

"The average loss of blood for the 363 was 277.7 g, which must be considered according to von Winckel a small physiological loss."

The birth of the placenta is shown in the following table:

Spontaneous	510	51 per cent
By light pressure or Crede	481	48 " "
By manual extraction	4	0.4 " "
Ditto in Cesarean section	5	0.5 " "

These figures are certainly a favorable answer to the charges that the method causes trouble with the third stage of labor.

Morbidity of Mothers.—This could be determined only by a special investigation. The fact that 330 patients taken at random who got up by the fourth day—the usual time in non-operative cases—only 1.7 per cent. had a temperature of over 38.5° C. (101.3° F.) indicates that the morbidity was not higher than usual.

Duration of Birth.—Not yet worked out for the second 500 cases. Any considerable prolongation, however, would show in an increased frequency of operation, which is not present. In the first 500, forceps were applied forty-nine times, in the second, only twenty-five times. The total figure, then, is 7.32 per cent., which is not much higher than that in Fehling's clinic.

(Strassburg) of 5.29 per cent. Indeed the *Daemmerschlaf* often enables one to avoid an operation, which most physicians would otherwise perform to satisfy the anxious relatives and suffering mother, because the successful operator with the *Daemmerschlaf* does not mind the patient's cries nor the family's remonstrances, being sure that after delivery she will have forgotten all. The statistics made public by Bokelmann in the Berlin Gynecological Society state that in his private practise of 335 patients he had applied forceps in 40 per cent., and that 20.8 per cent. of these were "*Erloesungszangen*" (rescue-forceps), without any other indication except to relieve the patient's suffering. In contact to this, Kroenig and Gauss have delivered 163 private cases without once resorting to the "rescue forceps."

Effect on the Child

Gauss says 'In support of my statement, denied by Hocheisen, that if by careful testing of the *Merkfaehigkeit* one avoids overdosing with scopolamine, and also gives very little morphine, one can wholly avoid untoward effects upon the newborn, I give the following comparative statistics, which show the great diminution in such untoward result in the second 500 cases with improved technic and dosage."

EFFECT OF TWILIGHT SLEEP ON THE CHILD

	Normal per cent	Oligopneic per cent	Asphyxiated per cent
First 500 cases	62	23.5	12.6
Second 500 cases	78.6	12.7	6.3
Total averages	70	18.1	9.6

Mortality of Children.—This may best be seen in comparison with the mortality in the ten years antedating the following table:

COMPARATIVE MORTALITY WITH AND WITHOUT THE ANESTHETIC

1895–1904 without scopol. (per cent)	First 500 cases (per cent)	Second 500 cases (per cent)	1,000 together (per cent)	Remarks
5.8	1.0	2.0	1.5	were dead-born, and of these
1.5	0.2	1.2	0.7	were dead before birth.
4.3	0.8	0.8	0.8	died under observation.
4.0	1.6	1.2	1.4	died in the first 9 days after birth; of these
0.3	0.8	0.8	0.8	died of birth-injury.
3.5	0.8	0.4	0.6	died of other causes.
49	13	16	29	died in all.

It is indeed very surprising that the mortality under scopolamine has been only one-third of its previous figure. Gauss does not claim that scopolamine is the chief cause of this great decrease; but Prof. Aschoff thinks that the great diminution in deaths during birth (21.5 to 4) may be due to the benumbing effect of scopolamine upon the respiratory center, which prevents so frequent aspiration of mucus with resulting fatal pneumonia.

Two Cases Seen by the Author

Thanks to the kind permission of Prof. Kroenig and Dr. Gauss I had the good fortune to see two cases delivered under scopolamine-morphine at the Freiburg clinic. I will close this review with an account of them and my own conclusions on the method.

The first patient was given the first injection only half an hour before the delivery, not being received earlier into the hospital, and so obtained no *Daemmerschlaf,* only a lessening of her pain. She remembered the details of the birth when questionend ten minutes later; the child was quite normal.

The second was quite successful, however. The woman was thirty-two years old, multipara; pelvis normal; a simple head presentation. Labor-pains began at 2 p. m., February 16. At 4 she complained of strong pain in the sacrum and body; the pains were coming every four to five minutes, were fairly strong, and lasted fifteen to thirty seconds. Accordingly, an injection of 0.3 mg. scopolamine with 0.01 gm. morphine was given at 4:30. The fetal heart, at this time, was beating from 144 to 156; mother's pulse 72, respiration 24, temperature 98.2° F. I wish to state here that a very complete record is kept on a large blank by the nurse, including beside the points above mentioned, the origin of the scopolamine and the date of its preparation (in this case from Merck and made up February 13), point of injection, memory of it thirty minutes later; then the subjective condition and remarks of the patient; and finally the objective condition, whether she sleeps between pains, the color of the face, influence on labor-pains, state of consciousness, hand trembling or other untoward signs, and also examinations and the course of the birth. All these details are to be filled in every hour in most cases, and this is conscientiously done. Dr. Gauss tells me he found it absolutely essential for the nurses to keep such a record in order to obtain the right dosage.

A second injection of scopolamine alone was given, 0.3 mg. at 5:30 p. m., which was remembered at six. At 5:45 p. m., however, she was sleepy, and at six had a reddened face (a scopolamine symptom), and gave no expression of pain; the labor-pains were good, coming every four to seven minutes and lasting thirty seconds. Pulse, 78. A ruler shown at six was remembered at 6:30 p. m., hence a third injection was given at 6:45 p. m. This also failed to induce *Daemmerschlaf,* and a fourth was given at 8:35 p. m., which was effective until after the birth, at 10:50 p. m. The record was doubtful whether she remembered the injection or not; but her confused speech, red face, lack of pain, and very rapid pulse (rising at 10:18 p. m. to 114) showed clearly that she was under the full effect of the drug—indeed, that she had had more than necessary for *Daemmerschlaf.* A total of 1.2 mg. scopolamine was given within four hours because the patient was so resistant to the effect. In spite of this large dosage and strong effect finally upon the mother, the child showed no oligopnea, being quite normal, and the woman suffered no subsequent injury.

The labor pains and abdominal muscles were affected as follows: at 9 p. m. the pains came every three to five minutes, lasted one-half minute and were strong, but at ten they came every five to six minutes, and were weaker. The woman would then not use her abdominal muscles well and the pulse varied greatly, now over 100, now over 70, and for a time very irregular. These bad effects on the heart and the uterine and abdominal muscles Gauss agreed with me in ascribing to overdosage with scopolamine. Still, the child was delayed little, if at all, coming before 11 p. m., or less than nine hours after labor began. Gauss says of this case: "The effect on the heart confirms the experiences of Hocheisen obtained when the *Merkfaehigkeit* was not properly tested. In this case it was tested only by the nurse, and not quite successfully. This case only shows the necessity of keeping a careful record of each control test of the *Merkfaehigkeit* (memory-power).

The mother, when questioned twenty-five minutes after the birth whether the child would come soon, replied confusedly, " I don't know," and thought it was still noon. I learned later from Dr. Gauss that she thought the birth of the placenta was that of the child. On closer questioning it was discovered that she thought she remembered the birth, because her abdomen suddenly became empty. More exactly she could not picture to herself. The placenta came spontaneously fifty minutes after the child, and was followed by a slight hemorrhage of 310 grams (about 10 ounces). There was no fever during the puerperium; the pulse ran from 70 to 86, and was not irregular. She got up on the second day, and was discharged on the ninth. The child weighed 2950 grams (6½ pounds), was born quite normal, was nursed and also received modified milk, and regained its birth-weight on the ninth day, when it was discharged well.

I wish to say in closing this review that I am personally convinced of the great value and merit of this scopolamine-morphine anesthesia in obstetrics, which I think might conveniently and deservedly be called " the Gauss twilight sleep; " and I hope that our American obstetricians will give the method a careful trial, conscientiously following the directions of Dr. Gauss.

Note: Since writing the above I have learned that Dr. Lanphear of St. Louis and Dr. Abbott of Chicago are using the *Daemmerschlaf* with success, but employ pure hyoscine instead of scopolamine. Dr. Gauss says that here in Germany the scopolamine is purer than the hyoscine. He has tried the hyoscine of Burroughs and Wellcome, England, with fair results, but has much more confidence in the scopolamine of Boehringer or Merck. However, the conditions may be quite otherwise in America.

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Several things are noteworthy: First, that Gauss realizes what some of our American wiseacres have scoffed at—that the purity of the drug used by him is of the utmost importance. He clearly shows that many, if not most, of the unfavorable results and accidents are due to the use of decomposed scopolamine and to overdosage. As Dr. Holt puts it, " he admits that scopolamine does not as yet possess the purity of most of our drugs." That is the point upon which we most insist and is the basis of our claim, that the surgeon and obstetrician should invariably use a pure hyoscine, which, while it may be *chemically* identical with the commercial scopolamine on the market,

therapeutically is not, and can be depended upon to be free from dangerous impurities, like apoatropine. Upon this point again we insist, with all the strenuosity we possess. Gauss tested every sample which he used. The average practitioner cannot do this, but *must be assured* that the drug which he uses is pure and safe.

Another important point is that the apparent asphyxia, really, as Gauss calls it, oligopnea (little breathing), is mainly due to giving too much morphine—in other words, morphine poisoning. This being understood, the remedy is easy—simply to give less morphine. Massage over the heart is the remedy applied by Gauss. Furthermore, the addition of the cactoid is justified by experience and observation.

The testing of memory-power, upon which Gauss bases his dosage, is simple enough, and will be a valuable pointer for American physicians.

[The results in this series of cases leave little to be desired. An expedient by which 1,000 women were delivered, without a death, and which reduced the mortality of the children more than 3 per cent., beside avoidance of the psychical shock and physical dangers inherent upon a general anesthetic, must command respect. Personally we believe that in the improved form, the H-M-C compound, this anesthetic and analgesic will prove one of the *great* things in medicine.—Ed.]

Since the preceding was written, Professor Gauss has delivered many more women—more than 8000 in all—and he has not found it necessary to revise the opinions expressed at the time the preceding paper was written. The technic remains practically the same.

How I Shorten the Course of Labor

By William Rittenhouse, M.D., Chicago, Ill.

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Twenty-five years ago the man who would have seriously proposed to employ systematic measures to reduce the length of labor in any except the most extreme cases of dystocia would have been regarded as a radical, and would have been silenced by the epithet, "meddlesome midwifery." Even to-day a considerable proportion of the profession look with suspicion upon the suggestion that a so-called normal case of labor should be interfered with simply because it is too prolonged. They are not quite ready to receive the idea that a woman who has been in labor forty-eight hours, and who has finally succeeded in delivering herself unaided, although exhausted almost unto death, has good grounds for accusing obstetrical science of inefficiency.

As a rule when a labor lasts more than ten or twelve hours there is something abnormal about it; and it does not seem unreasonable to demand that the doctor should possess enough skill and take enough interest to find out what that abnormal condition is. Indeed, I would go so far as to say that, when a woman has had good contractions for three hours without producing any apparent result in the way of dilatation, the attending physician should make a careful investigation of the case to discover if possible the cause of the want of progress. Similarly, if the case at any stage fails to make the progress that may reasonably be expected at that stage, the cause should be sought and remedied if possible. For example, if the head be long delayed at the inferior strait, it seems to me the height of folly to let the woman go on to exhaustion when a little assistance with the forceps will do in a few minutes what it would take her hours to accomplish unaided. Of course, when I say "the inferior strait," I mean the bony ring, and not the vulvar ring. Delay at the inferior bony ring is of no advantage to the mother, while a slow passage through the vulvar ring (the soft structures of the pelvic floor) is of the greatest advantage in avoiding laceration.

Causes of Delay

Among the causes that tend to prolong labor unduly we may mention the following:

Occipitoposterior position.
Short bag of waters.
Narrow brim.
Narrow outlet.
Large head.
Breech presentation.
Rigid os.
Feeble pains.

Occipitoposterior Position

Most of the causes named in the foregoing lengthen labor by causing slow dilatation of the os, thus making the first stage so long that the patient is exhausted before the stage of delivery arrives. Of all these causes the occipitoposterior position leads in point of frequency in the proportion of more than three to one. Most labors with the occiput posterior will, if unassisted, consume from thirty-six hours upward. If early recognized and corrected, they average little longer than do occipitoanterior cases.

In dealing with these cases, as long as they are making good progress I let them alone. If they do not (and this is usually the case), I aid dilatation until I can introduce my hand and rotate the occiput to the front, as described on a later page, to which I refer you for a fuller discussion of this complication.

Short Bag of Waters

Hitherto but little attention has been given to the condition known as short bag of waters. Most of the textbooks do not mention it. And yet, in an analysis of my cases since 1900, it stands second in frequency as a cause of prolonged labor. Previous to that date my records are not detailed enough to furnish evidence on the subject.

When the fetal sac protrudes through the os during a contraction, it makes an excellent dilator; but when it is too short to protrude, it has little dilating effect. The diagnosis is easily made by examining during a pain. If the finger can readily be passed between the os and the margin of the sac, the latter is not doing effective work as a dilator; for, if it did, it would be pressed so hard against the edge of the os that the finger could not be introduced without danger of rupturing the membranes.

When the sac is not doing its work of dilatation, it is best to rupture it and let the presenting part come down and act as the dilator. This usually is followed by decided improvement in the rate of progress.

Breech Presentation

In knee and footling cases, the progress usually is fairly good; in a true breech presentation, however, with the legs lying straight up in front of the body, the shape of the breech is such that it does not readily engage in the brim, and the first stage of labor is unduly prolonged. If progress is unsatisfactory, it is advisable to aid dilatation artificially until one can introduce a hand and bring down one or both feet, extending the legs. Then the matter should for a time be left to nature, so that the child's pelvis may have plenty of time in passing through the mother's pelvic canal to mold and crowd aside the soft structures, thus making more room for the easy delivery of the aftercoming head.

The very prolonged first stage so common in breech presentation is an infliction on the patient that is entirely unnecessary in most instances.

Rigid Os

The dilatability of the cervix varies very greatly, but, fortunately, a condition so unyielding as to require special or instrumental treatment is not very frequent. In the past fifteen years I have resorted to instrumental dilatation only three times, but I have used digital dilatation to some extent at some stage of the labor in at least fifty per cent of my deliveries.

A frequent use of it is where, in a primipara, two or three hours of labor produces little or no dilatation. Here, if the os is once the size of a half-dollar, progress will go on satisfactorily; still, nature often will require ten hours to reach a dilatation of one inch, while two fingers will accomplish it in twenty minutes. Here I am prepared to hear a storm of protests and objections:

"It is meddlesome midwifery!"
"There is danger of infecting the patient."
"There is danger of lacerating the cervix."
"It is too painful for the patient."
"It is contrary to established custom."

To the last indictment I most heartily and cheerfully plead guilty! No one is more ready than I to learn from the wisdom of our ancestors, but I have never doubted that those same ancestors would be grieved to think that the world should regard their attainment as the limit of human progress.

In answer to the other objections I may say that infection will not occur when proper asepsis is insured.

Laceration will not occur, because there is not power enough in the abductor muscles of the fingers to produce laceration.

As to pain, most patients do not complain of it when they understand that it will save them hours of suffering; nevertheless, a few nervous ones bear pain so badly that the artificial dilatation is not practicable.

And the final answer to all the objections is that twenty-odd years' practice of the method has failed to reveal the evils referred to; while, best of all, it has saved hundreds of women many hours of needless suffering.

Narrow Brim

When the head will not engage in the brim, either because it is too large or the brim too small, the labor will be extremely prolonged unless intelligent assistance is rendered early. Before the head can pass the brim it must be molded by the contractions crowding it against the brim for a considerable time. This molding will not even begin until rupture of the membranes lets the head down, permitting it to rest on the brim. For this reason much time will be saved by early artificial dilatation and rupture of the membranes, after which the affair may be left to nature for a time, in the hope that the head will be molded sufficiently to permit its descent into the pelvis. If this does not occur within a reasonable time the high application of the forceps becomes necessary. In extreme cases it may be necessary to consider podalic version, craniotomy, or Cæsarean section, according to circumstances. A slightly larger head can be delivered by podalic version with the forceps on the aftercoming head than can be delivered head first, because the head is a wedge, the chin being the small end.

Feeble Pains

Women who are broken down in health by much child-bearing, and occasionally others, have such feeble and ineffective pains that little or no progress is made. Under these circumstances it is especially important to render early assistance, because exhaustion comes soon with them, and is proportionately dangerous. It is these conditions that result in some of the worst post-partum hemorrhages encountered.

Uterine contractions may be stimulated by the administraion of 10 grains

of quinine, 1-60 or 1-30 of a grain of strychnine, or even ergot; but the latter should be given cautiously as long as the child still is in the womb.

Pituitrin is praised in some quarters, but it is probably too early to determine its exact value. I have not given it a trial.

Artificial dilatation of the os is one of the best uterine stimulants I know of. Of the drugs, quinine has given me the best results.

The Use of H-M-C

So often have I been asked for my opinion on the value and safety of the combination of hyoscine, morphine and cactin in labor, that I have thought it might be worth while to give my experience.

For many years I had made a study of the subject of unnecessary suffering during childbirth, for it had always seemed to me a reproach to the medical profession that it gave so little attention to mitigating and shortening the agony endured by parturient women. If doctors were as indifferent to other kinds of pain as they are to the suffering endured by women in childbirth, they most assuredly would be severely criticized. A patient writhing in the agonies of sciatica or gastralgia gets sympathy and prompt relief. A woman in labor, enduring agonies just as cruel, is told to "be brave." Possibly this indifference to the suffering of childbirth is a corollary to the old superstition that those sufferings are a penalty for woman's part in the free distribution of apples at the great land-show in Eden many centuries ago.

However that may be, I have long felt that if I could help to arouse in the profession a greater interest in this subject I should not have lived in vain. So, for the last twenty years, I have studied this mater at the bedside, for books give little help. I have been successful to a greater degree than I had dared to hope for at the beginning; and this success has been partly in the way of shortening labor, and partly in relieving pain.

The subject of legitimately shortening labor will be taken up at some fuure time. In this paper I shall discuss only the relief of suffering; this object, in my opinion, being best obtained by the intelligent use of chloroform and the combination of hyoscine, morphine, and cactin.

A Case Where the Hyoscine-Morphine Did Great Work

About six years ago I had a case in which the suffering of the woman was extraordinary. She was a primipara, of Polish birth, twenty-four years of age, vigorous, and of muscular build. The external os was high up in the hollow of the sacrum and firmly bound there by adhesions. In consequence, dilatation was slow, in spite of the fact that the contractions were terrific both in force and resultant suffering. Fearing rupture of the uterus, I resolved to try the hyoscine and morphine combination, of which I had read, but which I had never used.

I proceeded to dissolve one tablet of standard strength—representing hyoscine hydrobromide, gr. 1-100; morphine hydrobromide, gr. 1-4; cactin, gr. 1-64—and administered it hypodermically. The result was striking. In twenty minutes the intensity of the contractions was somewhat moderated. The patient would sleep quietly between pains. During the pains she seemed to be in a mild delirium, muttering incoherently, but answering rationally when spoken to. This delirium perturbed me somewhat, and I must confess to some anxiety as to the outcome; but I saw no further untoward symptoms. Upon completion of the delivery, the woman immediately went to sleep, awak-

ing after three hours and feeling well, and loud in her praises of the medicine that had helped her so much.

A Large Experience

Since then I have used the same remedy in more than three hundred cases, and always with satisfaction. I soon learned, however, that the full dose is not generally necessary, and I now give half the above dose, and repeat, if necessary, which is seldom.

At the present time I use the remedy in more than eighty per cent. of my labor-cases; there are a few women who bear their pains so well that it does not seem necessary to use any anodyne.

The advantages following the employment of this remedy, as I have observed them, may be set down as follows:

1. The sum total of the parturient woman's suffering is greatly reduced, while the effectiveness of the contractions is not impaired. The testimony of the patients themselves, as to the great relief experienced, is no small factor in building up a physician's practise, inasmuch as they are sure to tell their friends.

2. If chloroform is needed at all, the amount required is very much less under the circumstances.

3. At the end of a protracted labor the exhaustion is much less. The patient will usually go to sleep for about two hours, then awake in good condition.

Occasionally I am asked whether I have found the use of this remedy to cause more frequent postpartum hemorrhage. I have not found this to be the case; on the contrary, I think its tendency is the other way. One of the greatest factors in the causation of postpartum hemorrhage is exhaustion; and, as exhaustion is less marked when this remedy is employed, I see no reason why hemorrhage should be feared. As a matter of fact, I have encountered fewer postpartum hemorrhages than formerly, whatever the explanation may be.

Asphyxia of the Child?

I have also heard the objection that the use of the hyoscine and morphine preparation has a tendency to produce asphyxia of the child. I never have lost an infant from this cause. However, in several instances where I have used the larger dose or where the mother was under the drug's influence for an unusual length of time, I have found it necessary to use insufflation to establish respiration, and I have also observed that the infant showed a tendency to sleep for the first day or two. But where I have used only the half-dose, I have met with no trouble whatever.

On the whole, then, I regard this remedy as a most valuable addition to the obstetrician's armamentarium. On the question of its safety I no longer have any doubts. If the dangers of its use were great, I certainly should have discovered the fact in my three hundred cases. If others have had untoward results, I should be inclined to inquire whether they have not been due to the use of unnecessarily large doses.

Occipitoposterior Positions

In the beginning of this article I referred to the importance of this complication of labor. It occurs so frequently and so seriously inconveniences the

physician in many instances that I recur to the topic at this point in order to discuss it at greater length.

In looking back upon the more than a quarter of a century of my obstetric work, the most vivid impression on my memory is the recollection of the difficulties I encountered and of the anxieties I endured in the first ten years of that work; and now, when comparing notes with many of my fellow practitioners, I am forced to the conclusion that their experience has been, in the main, similar to my own. Constantly do I hear from general practitioners the assertion that they " hate " obstetrics and wish they could practise without doing that kind of work. Twenty years ago my attitude was exactly the same; many a time I went home from a difficult or unsatisfactory case feeling a profound disgust with the whole thing.

This widespread dissatisfaction with obstetrics and obstetrical results is due, in my opinion, to inadequate and impractical teaching. The student leaves college with a confused and undigested mass of information. His memory has been well stuffed with facts, but his judgment has been sadly neglected. Feeling his weakness, the neophyte tries to fortify himself with rules, and, in the ensuing years when confronted with a difficulty, he too often appeals to his memory instead of to his judgment. He is too apt to ask himself, " What was I taught about this? " instead of asking, " What is the common-sense thing to do here? "

Obstetrics, more than any other branch of the medical sciences, has been in bondage to tradition. We have paid too much homage to authority. The man who has had the courage to think for himself has too often been met with the cry of " meddlesome midwifery." As a result, many of our best men have been discouraged from that original thinking and original action which alone can make the practise of any art a source of satisfaction.

These reflections have been largely suggested to my mind by my observation of the management of that obstetric condition which forms the subject of this article, and by my investigation of the teaching (or lack of teaching) of the current textbooks on the subject.

The Troublesome Occipitoposterior Position

More than seventy-five per cent. of my consultation practise consists of cases where occipitoposterior positions have proven too much for the family physician. Finding the delivery unreasonably delayed, he has applied forceps, but failed in his efforts, because delivery was impossible without rotation, and rotation was impossible in the grip of the forceps. And, without casting any reflection upon that long-suffering individual, the family physician, truth compels me to say that I find an appalling number of instances where the position has not been diagnosed; where the mother has reached a dangerous degree of exhaustion from " leaving it to nature "; where she has suffered serious mutilation from unsuccessful attempts at delivery; or where the child's life has been sacrificed by the same attempts. It is not uncommon to find a doctor utterly exhausted from pulling on the forceps, trying to do the impossible; and sometimes a second man has spent his strength in the same hopeless effort.

In most of these cases, if early recognized and corrected, delivery would be comparatively easy, and with the happiest results both to mother and child—to say nothing of the doctor.

Textbook Instruction is Deficient

In looking over a dozen textbooks to see what they have to offer on this subject, I am driven to the conclusion that the family physician who turns to them for bread will find that most of them offer him only a stone of most indigestible quality. All these books state that the head in an occipitoposterior position should rotate to the symphysis pubis in its descent; but for cases where it fails to do so their recommendations are various and some of them unpractical and even dangerous. A few of the authors make suggestions that are simple enough to be practicable. Some of them almost ignore the subject. Quite a number recommend procedures that would certainly be dangerous in any hands except those of skilled experts, and I doubt whether they would be safe even in theirs.

In all but a very few cases of occipitoposterior position, delivery can be effected without resorting to measures that are complicated, difficult or dangerous. They can be corrected by means so simple and obvious that they can be employed by the family physician with confidence and safety. What is more obvious, indeed, than the conclusion that, if a faulty position delays or prevents delivery, the logical thing to do is to change the position to a more natural one? And this is the remedy in a nutshell:

When assistance becomes necessary, anesthetize the patient, introduce the hand into the birth-canal, lift the head and rotate the occiput to the front (a half circle always; never a quarter only). Then stop the anesthetic so as to get the benefit of the labor-pains. If these are strong, the delivery may be completed without further help. If not, the forceps may be used at any stage desired.

Those who have not tried this method of early manual rotation often express a fear that it must be very difficult. On the contrary, it is the easiest of all intrauterine manipulations; much easier than reaching up and bringing down the feet in podalic version; much easier than getting down arms that have become extended alongside of the head in a breech-delivery; and, what is more to the point, it is the easiest and safest way of correcting an occipito-posterior position.

Let us now consider the subject systematically and in detail.

Diagnosing an Occipitoposterior Position

The first thing, of course, is to establish an accurate diagnosis, by means of some or all of the following methods:

1. Digital palpation of the sutures and fontanelles.
2. Location of the fetal heart-beat.
3. Manual palpation of the fetus through the abdominal walls.
4. Digital palpation of an ear *per vaginam*.

In addition to these tests, we must not overlook a symptom which, while it is not exactly a means of diagnosis, yet has considerable diagnostic value, inasmuch as its presence should always make us suspect a posterior position.

I refer to the frequently observed fact that in occipitoposterior positions, unless the head is small, there comes a time during the first stage of labor when progress practically ceases, even though the pains continue. This is usually when dilatation of the os is from one-half to three-fourths complete. A considerably larger head can be born without assistance if it lies occipito-anteriorly than if it lies occipitoposteriorly. In fact, only the small heads starting with the occiput behind will spontaneously rotate to the front when

they reach the pelvic floor. The large ones will come to a standstill before the first stage is over. Therefore, when this occurs it is proper to suspect a posterior occiput, if the diagnosis has not already been made.

Before any operative procedures are undertaken, the diagnosis must, of course, be absolutely certain; and, of the means mentioned above, all except the last are subject to error. Test number 1 in the list is conclusive if the sutures and fontanelles can be felt; but some heads are so smooth that even the expert is left in doubt. Number 2 is fairly reliable in L. O. A. position, but in the other three positions it is inconclusive. Number 3 is of little value in dealing with very thick abdominal walls or with a tense uterus containing much water. But palpating an ear leaves no doubt whatever and can be done when the patient is anesthetized for the purpose of correcting the position. Or even anesthetizing the patient for purposes of diagnosis is just as legitimate in obstetrics as in surgery.

Having diagnosed an occipitoposterior position, no interference is called for as long as the case is making reasonable progress. If spontaneous rotation and delivery will take place, so much the better. But, if descent and dilatation have come to a standstill and the patient shows evidence of exhaustion, it is time to interfere. And right here occurs the temptation to the inexperienced to put on the forceps and pull until he is exhausted, in a vain attempt to do the impossible. Delivery is impossible without rotation, and the head cannot rotate in the grasp of the forceps.

How to Correct the Malposition When This Position is Present

After the patient is fully anesthetized, the hand should be introduced into the vagina (slowly, so as not to lacerate the perineum). An exact diagnosis should be made by palpating an ear, so as to ascertain the degree of obliquity. The head should now be lifted up and rotated a half circle, bringing the occiput to the front—that is, an R. O. P. should be converted into an L. O. A., while an L. O. P. should be converted into an R. O. A. I advise the half-circle rotation, because when I have tried rotating only a quarter circle I have found a tendency to spring back to the original position. This is, no doubt, due to the molding of the mother's soft parts.

In grasping the head to rotate it, the operator's fingers should project past it far enough to touch a shoulder, so that the body may be rotated with the head. I find that the body rotates so easily that possibly this precaution may be unnecessary; but I always observe it, for fear that without it the neck might be twisted to a dangerous degree.

Another precaution to be observed is that, if a loop of the cord or an arm should come down, the prolapsed part should be restored before allowing the head to settle down into the brim.

The position having been converted into an occipitoanterior, the operator may now choose whether he will withdraw the anesthetic and give nature a chance to complete the labor, or whether he will at once apply the forceps and deliver. In deciding this point, it is well to be guided largely by the patient's condition before the anesthetic was given. If the contractions were vigorous and the patient was not unduly exhausted, nature may be given another chance; but as a rule I believe it is wiser to avoid further delay.

I believe the profession is beginning to recognize more and more the unwisdom of permitting extreme exhaustion of the mother if it can be avoided.

Undue exhaustion carries with it greater dangers than the slight risks of early assistance.

Other Methods of Procedure

The only other method of treating an occipitoposterior position that seems to me justifiable is to endeavor to secure rotation by repeated readjustment of the forceps. The forceps are adjusted slightly askew; then moderate traction is made, with a twist in the direction in which rotation is desired. When enough rotation is accomplished to bring the instrument straight or a little beyond that, an assistant should crowd the uterus and its contents downward, to prevent losing what we have gained, while the forceps is withdrawn and again applied a little askew. Then the traction and twisting are repeated. Quite a number of readjustments may be necessary to bring the occiput to the front.

Some years ago, before I had learned how easy it is to do the manual rotation described above, I resorted to this method a number of times; sometimes with success, and sometimes with unsatisfactory results, occasionally failing entirely, and often injuring the child because such great force had to be exerted.

One writer advises applying the forceps and twisting the head around until the front of the forceps is toward the mother's sacrum. How he can reconcile such advice with the anatomy of the pelvis is to me incomprehensible. The extreme curvature of the pelvic canal and the corresponding curvature of the forceps blades seem to render such a procedure certain to inflict injury upon the mother.

It has been objected that the introduction of the hand is liable to carry infection, and that, therefore, careless operators might do harm; but the same objection could be made to every form of obstetrical and surgical procedure. I am no more afraid to introduce a clean hand into the uterus than I am to put it into the abdomen in a laparatomy or into any surgical wound. The man who does not properly sterilize his hands is, of course, unfit to do intrauterine manipulations, but he is equally unfit to do obstretrics at all. The world cannot stand still because there are always a few who do not keep step with the march of progress.

Another objection has been raised to the effect that, if the head were down low in the pelvis, it would be difficult or impossible to lift it up above the brim.

The answer to this is twofold. In the first place, the cases in which the head descends are not the ones in which help is required. As a rule, if the head descends, it will rotate. It is when the head remains high up until the mother is exhausted that we have to offer assistance. In the second place, even when the head has been dragged down low in the pelvis by means of the forceps, in a vain attempt to deliver without rotation, I have always been able to lift it up if the patient was well anesthetized and placed in the Sims position. True impaction is rare.

In a few cases where the occiput had rotated to the hollow of the sacrum, I had a little difficulty in getting the head up above the brim, but patient effort was always successful. In this case a twist must be added to the upward pressure; in other words, the head must be sent back the way it came. Lifting it directly upwards without any rotary movement necessarily would be unsuccessful because of the promontory of the sacrum.

That this subject is one of great importance is shown by the fact that, according to statistics, about twenty-three per cent. of all cases are occipito-

posterior; in other words, a little more than one case in every five. I am strongly of the opinion that in a large majority of the cases where labor lasts longer than twenty-four hours the cause is an occipitoposterior position.

For a number of years I have employed the method here described on an average of about once a month. It has greatly reduced the average length of labor, the average force required in forceps delivery, and the average of injuries inflicted upon both mother and child. In consequence, I can say that nothing has done so much to make the practice of obstetrics a source of satisfaction to me as has the adoption of manual rotation for occipitoposterior positions.

Conclusion

In conclusion let me say that no one can more readily concede than I do myself that the remedies discussed in this paper may be capable of improvement. I shall rejoice if better ones are found. But regarding the importance of the subject I think there can be no room for two opinions. Is it any wonder that the intelligent and cultivated modern woman shuns child-bearing, in view of the fearful and prolonged suffering, much of it avoidable; in view of the cruel lacerations and mutilations, many of them needless; or in view of the semi-invalidism from which obstetrics, as now conducted, has failed to save so many of her sisters?

The American Method of Inducing "Twilight Sleep" With Hyoscine, Morphine, and Cactoid

We have given in this treatise, at considerable length, the method of inducing the *Daemmerschlaf,* or "twilight sleep," practiced by Kroenig and Gauss, and by their followers. This method has been used in America to a limited extent, principally in a few hospitals, as, for instance, in the Jewish Hospital, New York City. But there is another and better-known method which has now been in use in America for nearly a decade. We refer to the use of the hyoscine, morphine and cactoid combination, which is also widely employed for the induction of surgical anesthesia.

The latter method differs from the Freiburg method principally in the dosage of the drugs employed, and in the technic. The sedatives used are much the same in either instance. For scopolamine the American has substituted hyoscine. The two alkaloids are now known to be chemically identical—*when pure.* Unfortunately, when scopolamine-morphine anesthesia was introduced in America, the scopolamine was not uniformly pure, and bad side-effects undoubtedly resulted therefrom. The hyoscine obtainable was much better, and it was therefore preferred—and the results obtained have fully justified its continued use.

Morphine is used in both methods, except that at Freiburg, after a primary dose of good size, it usually is not repeated, the anodyne or amnesic effect being maintained by the scopolamine alone. In America, while a single dose of the combination is usually considered sufficient, in case of necessity the entire combination may be repeated, *small doses of both the hyoscine and morphine being insisted upon.* However, there is no objection to maintaining the action of the hyoscine and morphine tablet by hyoscine alone, if the physician wishes to follow the general Freiburg scheme.

The American combination also contains cactoid, the concentration of cactus grandiflorus, which has a steadying action upon the heart, thereby serving to reduce the possibility of cardiac irregularity and vasomotor disturbance.

The Use of H-M-C in Obstetrics

The rules for the administration of H-M-C in obstetrics are exceedingly simple, but they must be punctiliously followed. They rest upon three cardinal principles, which should be constantly borne in mind:

(a) The usual indication for the initial injection is the occurrence of true labor pains at frequent intervals. It may be necessary to give an early injection of one No. 2 tablet to control false "nagging" pains which so often exhaust primipara.

(b) The test of "effect" is *not* the total cessation of the patient's moans or complainings, but the failure of memory and ability to sleep between pains.

(c) The chief element of danger, to mother or child (principally the

latter), lies in an excessive dosage of the *morphine,* against which one must be guarded in each individual case.

The formula of H-M-C, No. 2 (half-size), referred to in the preceding, and which is exclusively employed in obstetrical work, is as follows:

Hyoscine hydrobromide	gr. 1-200
Morphine hydrobromide	gr. 1-8
Cactoid	gr. 1-128

Rules for the Use of H-M-C.—Now for the technic. The following simple but important rules should be read carefully—reread, if necessary, until the physician is thoroughly familiar with them:

1. Very nervous women (primiparæ usually) suffering from early "nagging" or "false" pains before the os is dilated, may receive one half-strength tablet, which will give from six to twelve hours' rest. Caulophylloid (gr. 1-3) will, however, often suffice, the dose repeated every thirty minutes to effect and thereafter as required.

When true labor pains come on, with no especial call, withhold H-M-C till the os is well dilated (unless the stage is prolonged, when treatment may be given as above) and expulsive pains begin, then give one half-strength tablet, not repeating the dose except when absolutely necessary, before the head descends upon the perineal floor.

Only at this stage, in all ordinary cases, should the second tablet be given—and not then unless needed, as complete expulsion (unless forceps are used) may be delayed.

Until the user is experienced in the use of H-M-C in obstetrics this, the final dose, may well be replaced by a few whiffs of chloroform.

2. Where more than one full-strength or two half-strength tablets have been given within six hours, it is not desirable to repeat the dose prior to the expulsion of the head unless the woman is really suffering keenly at this the final stage. Should this be the case, inject one half-strength tablet and, after five minutes, push delivery.

3. In typical cases (multiparæ) "one half-strength H-M-C tablet given when the os is well dilated and another as the head begins to press the perineum" will prove a safe rule to follow.

4. H-M-C given in full doses early in labor (before placental circulation is lessened) affects mother and fetus. Given later it acts promptly upon the mother, but very slightly on the child. "Blue babies" are not uncommon under any procedure. But if occasioned by H-M-C at all, they are usually the result of full doses given too early, through direct action on child, as above, or by reason of delay in delivery, all of which, with a little care, may be avoided.

5. In women peculiarly susceptible to H-M-C, expulsive pains may temporarily cease after the first injection. Should they do so, two to five grains of quinine sulphate will promptly restore them. In some cases it may be given per rectum with advantage. Repeat in one-half to one hour if required.

6. Hydrastinine hydrochloride (gr. 1-12) given with a little hot water, will speedily control persistent "oozing"—should it occur—after delivery. No more is likely to occur with H-M-C than without it.

7. It is well always to see to it personally that the child is breathing normally before giving it over to the nurse for care. Ligate and sever the cord promptly (unless delay is distinctly indicated). Slightly blue or feebly breathing infants should be slapped smartly with a wet towel, plunged alter-

nately into hot and cold water, and should receive gr. 1-64 of cactoid in solution.

Conclusion

Any remedy that is powerful for good is also potent for evil, *if improperly used.* This is true of H-M-C, just as it is of morphine alone, or of strychnine, or of arsenic. Until the physician is familiar with its use, he should proceed cautiously, always using the smallest possible quantity required to produce the result desired. If it is necessary to give more of the anodyne at any time, begin with *small* quantities remembering that after the dose is injected the action of the drug will continue for some time to come, without possibility of great modification. No harm can come from too little; danger lies in over-dosage, especially of the morphine.

The physician who adopts this cautious policy at the beginning, and who adapts his remedies to the needs of each individual patient, will soon arrive at a therapeutic precision that will practically remove the possibility of danger, and give him a confidence in this method of relieving the pains of labor which will extend to his patients also.

Pituitrin Used to Shorten Labor

Within the last two or three years the extract of the pituitary gland, or pituitrin, has been used to shorten labor, with alleged excellent results. A number of physicians of our acquaintance have written us of the advantages of combining the action of pituitrin and H-M-C in their obstetrical work. Inasmuch as the pituitrin undoubtedly has a large and useful field in these cases, we shall quote at this point the advice of Dr. N. H. D. Cox, printed in *The American Journal of Clinical Medicine*. He says:

"Of late we have been reading of the Freiburg (Germany) method of inducing painless childbirth, or the 'twilight sleep,' as it is called by those who have gone to Freiburg to have their babies delivered.

"To readers of *The American Journal of Clinical Medicine,* this 'new' method is not so very new, I do believe, because I, with so many others, have in our quiet way practised it for some years by the use of the hyoscine, morphine, and cactoid compound. Of late, since the introduction of pituitrin, I have found (and doubtless others have also) that by combining the two drugs, or preparations, not only can we secure painless childbirth—or 'twilight sleep'—but also a very much shorter period for the parturient patient.

"When we are called to a case of labor and find the soon-to-be mother in fear and agony of pain, we do not wonder that women will travel from India, Russia, China, America, England, and, yea, far isles of the sea to this Frauenklinik at Freiburg to be delivered painlessly of their babies nor can women be blamed for not wanting to go through this terrible ordeal of bearing babies when we consider the horrors of death almost through which they are called to pass for man's sake. And it is not to be wondered at when we see young women and old running hither and thither to find a doctor who will rid them of this terrible ordeal. They fear pregnancy; they will go through fire and water to prevent it.

"I say we cannot, in a way, blame women for this thing, unless we find a way whereby they can have their babies painlessly, just as the doctors of the university at Freiburg have done. Regardless of scripture, 'In sorrow thou shalt bring forth children,' the woman of to-day—not the lower type, but the society woman, if you please, or she who cannot or will not bear pain—has determined not to bear children, unless there is a way for her to do so without pain.

"Now, while Doctors Kroenig and Gauss of Germany have become specialists in this art by the use of scopolamine, many of us have been using a similar treatment, namely, hyoscine, morphine, and cactoid. Still, while I have found that this H-M-C combination worked wonders in relieving this distress, I have felt at times the need of something else and therefore determined on a new line of treatment. And this is what I do:

"Take, for instance, a case where we find our patient with beginning labor-pains and the os about the size of a 25-cent piece, and the vulva rigid.

I give the woman a hypodermic injection of hyoscine, morphine, and cactoid; then, after an hour, I ask her if she remembers her pain or whether the hypodermic I gave her hurt her. If she has forgotten it, then I am quite sure she is out of her agony, although still having her contraction.

"At this critical period, if the child's head has come well down but the contractions are not sufficient to expel the child, I give her a hypodermic injection of pituitrin. This in a few moments will bring delivery of the child. Then it is that I support the perineum, lest it rupture—so strong are the expulsive movements. In a number of my cases, labor has been over in from eight to fifteen minutes after the injection of the pituitrin.

"If after an hour after my first injection of hyoscine, morphine, and cactoid the patient feels the pain and remembers everything that has occurred meanwhile, I give the second dose, then wait fifteen minutes or half an hour before giving the pituitrin. When this rule is followed I very seldom need to use the forceps.

"If, on the other hand, I am called to a case where there are no labor-pains and the patient is simply tired of waiting, and the head is well down, I often simply give the pituitrin, and in a few moments the child is born, almost before the mother realizes any pains. But you will find that it will please the patient most if you give the hyoscine, morphine, and cactoid and wait a time for her to rest before giving the pituitrin. Invariably patients will tell you the next day that they did not suffer as much pain as at their regular monthly periods.

"There is one other thought in regard to the use of pituitrin, namely, that it not only in most cases terminates labor so quickly, but there is very seldom need of waiting for the placenta, for it usually is expelled within a few moments after the child, and that complete."

Commenting upon Doctor Cox's statement, the editor of *Clinical Medicine* says:

"There can be no question as to the efficiency either of hyoscine, morphine and cactoid, or of pituitrin. It is not always advisable, however, to use the latter agent, whereas in practically every delivery the sedative combination may be administered with distinct advantage both to patient and accoucheur.

"It may be well to call attention here to the fact that there are two ways in which hyoscine, morphine and cactoid may be employed: (1) As a routine measure to induce the so-called 'twilight sleep' during *normal* deliveries; and (2) as an anesthetic proper in cases where operative procedure renders a deeper (surgical) anesthesia essential. Naturally, the amount of drug used and the technic employed vary materially according to the purpose for which it is used.

"In a certain proportion of cases, the intelligent use of pituitrin would, undoubtedly, arrest antepartum hemorrhage and obviate the necessity for version or the application of forceps, and, as Doctor Cox points out, when it becomes necessary to administer a promptly and powerfully acting oxytocic to a woman under the influence of hyoscine, morphine and cactoid compound, this agent may be used with comparative safety.

"Pituitrin acts with extreme rapidity; indeed, several accoucheurs have told the writer if they do not secure the desired result within twenty minutes they cease to expect it. It must be stated that such failure to act under apparently ideal conditions is not infrequent and has caused many men to relinquish the use of pituitrin. It must not be forgotten either that very serious

conditions have presented after the administration of ordinary doses to apparently perfectly healthy women.

" We are inclined, therefore, to regard this drug as an extremely useful but not indispensable addition to the obstetrician's armamentarium—as a potent agent to be used carefully when certain well-defined conditions are present and when parturition is unduly prolonged. That it may be administered under such circumstances to patients already under the influence of hyoscine, morphine and cactoid is decidedly an advantage, but to regard it as a desirable addition thereto in any or all slow deliveries is, we think, unwise.

"'We have much yet to learn regarding the action of pituitrin and before subjecting the system of any parturient woman to the effect of this drug plus that of hyoscine and morphine, we must, if we would keep a clear conscience, feel convinced that the end will justify the risk.

" It is in ordinary accouchments that hyoscine, morphine and cactoid proves most useful. Correctly used, by an unhurried attendant, it not only dissipates fear and pain but produces conditions which favor gradual (and, therefore, natural) expulsion of the infant. The use of pituitrin under such circumstances could not be deemed desirable.

" That under certain conditions hyoscine, morphine and cactoid and pituitrin can be used conjointly, Doctor Cox has clearly proven, but where the combination—or pituitrin alone—can be used to advantage occasionally, hyoscine, morphine and cactoid can—and should be—employed in *every* delivery. Sooner or later it will be so used."

Painless Labor, and How It Can Be Secured

A Method of Preparing the Woman for Confinement

By Finley Ellingwood, M.D., Chicago, Illinois

Editor of "Ellingwood's Therapeutist"; Author of "The Treatment of Disease," "Materia Medica, Therapeutics and Pharmacognosy," and "Normal Pregnancy and Labor"

Unusual as it is for a lay journal to publish a professional article, a number of the popular magazines contain strictly professional descriptions of a method for the relief of the pains of childbirth, a method which cannot in any part of its phases be adopted independently by the laity. The procedure described in that article has been followed, it is claimed, for eight years in the University of Baden at Freiburg. This method claims to anesthetize the mother so completely, yet without influencing other conditions of the system, that the pains of parturition are not observed; and, further, that under this method complications and shock to the mother have been avoided, while the rate of infant mortality has greatly decreased.

The method described consists of the use of scopolamine and morphine in ways that are not at all unfamiliar to the profession. The author attributes the discovery of the method to Doctors Kroenig and Gauss, and claims that it can be used only in small hospitals and then only by those who are fully expert in handling such dangerous and concentrated remedies. The insensibility induced is called the "twilight sleep," and to secure it a great deal of skill necessarily must be exercised. The patient must be kept quiet, the mind must be diverted from everything except that which the physician desires, and the patient be put into a state of real or apparent unconsciousness.

"In a report of 3600 cases, twilight sleep," this article says, "has caused no injury to the mother; not a fatality is charged to it. The muscular activity of the mother is not restrained. The birth period is not appreciably lengthened, except in those which call for operative interference. No hemorrhages are found to result from the use of the remedies, and the use of the forceps is in part done away with. As a result of the unconsciousness of pain, there is no nervous exhaustion and there are no complications due to nervous irritation, and the patient makes a rapid and satisfactory recovery."

This certainly is a most desirable accomplishment in obstetrics. However, when we come to know that by the use of very simple measures, by taking our patient into our confidence as soon as pregnancy is determined and continuing our observation of her for the entire term, together with the use of remedies well known to the profession, we may accomplish all of these things in a manner so rational, so natural, and so consistent with the opera-

tion of every function within the body, we feel more certain than ever that America and its methods of determining exact drug action with the alkaloids and concentrations joined with definite therapy, really is deserving of some little praise, instead of having all of it bestowed upon our German confrères, as is now the habit.

There is a tradition and belief, based upon a passage in the Bible, to the effect that, because of the sin of the first woman, the statement, "In sorrow shalt thou bring forth children," was intended as a decree that, as a direct punishment, pain was to be the unavoidable lot of every mother forever after. Inasmuch as this curse was pronounced after the great sin, which is said to have inflicted sorrow upon all mankind, was committed, the conclusion is logical and authorized that woman originally was so created as to give birth painlessly to her offspring. Other essential functions of the body are performed in a painless and to a large extent pleasant manner, and, so, it is a rational conclusion that the meaning to be conveyed in the biblical quotation is that the curse of pain in giving birth would attach as the result of the sins that would be committed in every direction and in every mode of human activity—that these would bring about such a physical condition in women that pain at childbirth must unavoidably result.

I believe that there can, and will be found in nature a cure for every ill when the intelligence of man has determined what that cure is to be. It remains, therefore, for those whom God has blessed with their intelligences to peer into the causes of disease and adjust to these perversions of the potential mother's economy, of which bad habits have been the cause, a cure in the strictest sense of the word—a method or methods that shall preserve intact every function of the body and prevent its being disturbed by the unusual—although perfectly normal—condition of pregnancy and labor.

The greatest mystery in science is the mystery of life, its origin, its perpetuation. Motherhood is the working together of the woman with God in such a manner that the physical life of the mother together with the spiritual essence of God shall be put into a new being that is to be newly started upon a course of human existence.

In animals—and in woman in her natural state (which is understood to be a state of physical being unhampered by any of the customs, habits, methods or demands of civilization)—parturition is painless, or comparatively so, and devoid of danger. Women of savage nations bear children without experiencing pain. They live much in the open air, their physical nature is developed almost exclusively and is thus more nearly normal than that of their civilized sisters. It was the opinion of Huxley that the bearing of children ought to become free from danger as much to the civilized woman as to the savage. I positively believe that to a mother who is physically perfect parturition can be made devoid of danger and almost, or even entirely in some cases, painless.

It is surprising that the belief is general among civilized peoples that the pain and complications of childbirth usually are unavoidable and that a severe or dangerous delivery is a natural condition, and this opinion is fostered to a large extent by the profession. Being thus so, it is looked forward to by the expectant mother with dire anticipation and dread, as essentially hazardous both to herself and her child; and this fear with which many look forward so influences their mental condition as in some cases almost to unbalance the mind.

Pregnancy and Childbirth Are Physiological Conditions

After an observation of thirty years, I have come to the conclusion, as have many others who have observed in the same lines, that childbirth is not essentially dangerous nor even severe in its processes; that it not only is possible to modify the conditions of labor, but that the woman can be advised and existent conditions so influenced or controlled as to make labor, if not absolutely painless, at least devoid of danger, and an event to be looked forward to without fear.

We must accept the assertion that pregnancy and child-bearing are normal physiological conditions. They are natural organic functions, the same as eating or sleeping or the evacuation of the secretions of the body. In the case of these latter conditions we tolerate no abnormality. Why, then, should we tolerate any variation whatever from the normal in women during pregnancy or at the time of childbirth?

With all our advances in every other branch of science, we have paid too little attention to this important condition. It is an unwarranted mistake for a physician today, in view of the marvelous advance in all things else in the profession, to conclude that this condition cannot be corrected. It behooves the physician—in fact, it is his duty to mankind—to charge his own mind first of all with the truth of the claim that these abnormalities are pathological, unnecessary, and unjustified, and that, if he does not correct them, he is personally to blame for much suffering and, maybe, the death either of the patient or of the child. The physician must educate himself to detect as soon as it occurs every variation from the normal in the pregnant woman; and we have now the best means for that purpose the world has ever known. Meeting these, as he can if he is correctly informed with the indicated measure or measures, he can do away entirely with them all in large part, and ultimately altogether.

So common is the belief of every mother that she must suffer pain and discomfort and a long train of unavoidable symptoms that she submits uncomplainingly, believing that these are unavoidable. It, therefore, is the duty of the physician, not only to educate himself to this belief, but so positively to educate his patients to the fact that, if they place themselves in the hands of a physician at the beginning of the pregnant term, the long train of symptoms is avoidable, that they can enjoy perfect health, can approach the moment of childbirth without fear, can pass through it with no more danger than if sleeping in their own comfortable bed, and can go through all this with full consciousness of every procedure, yet, experience so little pain as to be absolutely unobjectionable to them; and, moreover, that their recovery will be without any untoward incident. In fact, in most cases, so little impression has been made upon them that they are inclined, like the Freiburg patients, to get up immediately and dress.

Unless, however, the patient is fully educated as indicated, she will not carry out the instructions of the physician, and, unless the physician so thoroughly educates himself and becomes convinced of the necessity of following out each train of abnormality for its immediate relief, he will not give the essential advice.

Under the method herein described, each abnormal condition becomes a specific one; and, as soon as conditions become specific and we are enabled to adjust a remedy for the specific condition, we find them to be precisely as other specific conditions—very amenable to treatment. If we fail to

obtain this knowledge, the patient has reason to complain most bitterly of our ignorance or negligence.

For our criterion, we must keep in mind the fact that natural labor should be a short, easy act, with muscular effort at expulsion sufficient, yet devoid of severe pain, and should occupy a period of from two to six hours; the severe pain, if any, occurring only during the actual expulsive effort.

A method in which nothing else is taken into consideration but the use of certain anesthetics would be incomplete. We have other anodynes and anesthetics that relieve pain which are greatly in advance of the methods of even the recent past; but the method which I am advocating does not resort exclusively to artificial means, and such dependence is not nearly as satisfactory or as consistent with life as it is to put the patient into an absolutely normal physical condition, so that disturbed function, distress, pain, and shock are not induced by the processes of labor. Normal health-processes are not interfered with and there is to be no such thing as "recovery" after parturition, as the patient remains in the same normal condition after labor as she was in before, without shock, weakness, nervous irritation or other perversion of any organs or function.

The Natural Versus the Artificial Method

I have had an opportunity of observing, or others have observed for me, more than 1000 cases, and the results of the course to the mother and the physical condition subsequently of mother and child are so far beyond that which anyone inexperienced would anticipate that it is thought by some almost to be miraculous.

The immense superiority of this course over a course of exclusive dependence upon narcotic drugs, is, the retaining of a perfectly normal condition, the doing away with nervous and muscular irritation, the preservation of the functions of the stomach and intestinal tract, in fact, the entire preservation of all the normal body functions. To secure such important results, can be no other than infinitely superior to a method that consists only in the alleviation of pain.

Among the traditions that are seriously at fault, there is one that the father seems to take pleasure in. It is that a new-born child must be a heavy child. Long observation has taught me that labor with heavy babes is correspondingly increased in severity, and that it is not the heavy infants alone that make strong children, nor that small children are essentially difficult to raise. We have all seen 4-pound babes that did as well in every particular as those weighing 10 pounds. On the other hand, many infants born with a weight of from 8 to 12 pounds have been as difficult, in every way, to raise as those who were smaller; neither are those that are heavy any more perfect in adult life than those that are light. Pregnancies that are prolonged to ten or eleven months make almost invariably very severe deliveries, because of the increased growth and development of the child.

No physician who has not tried to modify the development of the fetus during gestation has any idea how readily this can be brought about. In fact, so readily can it be accomplished that a physician must be exceedingly cautious about advising his patient, in order that the infant be not insufficiently developed. One of the strong factors in accomplishing this is, the dieting of the mother.

Importance of the Nutrition of the Mother

In the second year of my practise, I had the opportunity to observe the influence of deficient feeding of the mother upon the child. I was located among miners. A strike was declared and for a year there was no work. After the first month, extreme poverty settled down upon the entire community, and for the intervening months almost the entire food of from 5000 to 7000 people was corn-meal and water, with a limited supply of meal. I have always regretted that I did not secure exact statistics of this famine, as I readily could have done. If I had had any knowledge of the use I could have put them to in the future, I certainly should not have neglected it.

The proportion of expectant mothers who brought forth their children alive was very small. Miscarriages were the rule. Of those children who were born alive, very few lived. The food of the mother had been so scanty and covered so small a proportion of the demands of the system of the little one that every child was in an unbalanced condition physically. They were very greatly emaciated. Their bones were long, but were soft. The heart's action was feeble; the muscular contractions were imperfect, but there was as I now remember, no great number of deformities or malformations. The defect was a general one. If the deliveries were severe, they were so because of the weakness of the mother.

This observation literally convinced me that a careful feeding of the mother, with a thorough understanding of the demands both of the mother and the fetus, would produce a child of proper weight, with proper osseous and muscular development, one that could be readily expelled without any interference whatever, with the normal functionating of the vital organs. These facts I have found to be true.

The Question of Diet

In order to make essential adjustment for each mother, we advise that the patient herself enter fully into the consideration. In the first place, a prevailing inclination to acidity is nearly always present, and this usually is due to hyperchlorhydria. I have determined that, if the fruit-acids are administered in a reasonable quantity, there will be a diminution of the secretions of hydrochloric acid and a more normal balance of the entire acid constituents of the gastric fluids. This is quite important with all patients, but much more important with those who are inclined to bring forth large children with overdevelopment, especially with an excessive bony development. With this latter class, the nitrogenous foods must be avoided to a greater or less extent.

While it is common to say that a patient should avoid meat entirely, we do not lay this down as an arbitrary rule, but we do advise these patients to exclude meat entirely, during the latter part of the pregnant period, unless there is a peculiar weakness that can only be overcome by red meats. I have seldom found this to be the case, as white meats, fish, with eggs and milk usually are sufficient and their nitrogenous content is not too great.

Patients in a medium condition are allowed a small beefsteak two or three times a week, unless the specific gravity of the urine is very high. With such patients, we exclude meats, coffee and tea during the early period entirely and only for a short period at a time permit these later. This measure will be found sufficient in most cases; but there are some extreme cases, especially with women with black hair and black eyes, where the uric-

acid tendency is very strong, in which I have found it necessary to keep the patient upon fruit and vegetables alone. Experiments with fruit dieting alone have been carried to such an extent in some cases as to prevent proper ossification of the bone, the infants being born with a structure largely cartilaginous.

It is often found where the infant is born with excessive body development that the mother becomes greatly emaciated; in fact, there are many mothers who give up the nutrition of certain portions of their system to the child. Occasionally these mothers become very feeble, and it becomes necessary to feed them on concentrated nutrients. Those foods which do not present a large percentage of earthy salts, such as rice, potatoes, eggs, products of wheat, flour, milk, these are essential with this class of patient. For animal food, fish is excellent for these also, as it supplies a fair amount of nerve-food. These patients do well also on a certain amount of corn-meal, as this assists in preventing constipation, which such concentrated food is apt to induce.

The supply of the bony and nerve structures of the infant make such a demand upon some mothers for the phosphates as to induce spinal irritation or mental irregularities, and in some cases puerperal mania. I had a case which illustrates this fact.

A mother, because of severe headache, had been kept on morphine for two weeks. When death threatened, the woman was placed in my hands for treatment. I let her come out from under the morphine and discovered her to be a raving maniac. She was restored to a normal mental condition within ten days by the use of bovinine in large doses every hour or two, the phosphates, milk and eggs, with counterirritation to the spine—which was exquisitely tender.

Regulation of the Mother's Habits

The habits of elimination of the patient must have careful consideration. With some patients, the normal excretion of the skin and kidneys is limited and constipation is almost constantly present. If those foods that contain a large quantity of waste matter, that will stimulate peristalsis, and a minimum of nitrogenous substance, with an abundance of water be furnished, there will be material benefit.

Careful advice must be given the patient concerning dressing. She must not have compression anywhere. There must be but little weight hanging from the waist; the weight must be carried from the shoulders. The clothes must be light, yet sufficiently warm and comfortable. This goes without saying.

Out-of-door air and sunshine are exceedingly important to pregnant women; cheerfulness of mind, the cultivation of higher ideals, the entertaining of pleasant thoughts and generous impulses, the carrying out of some course of occupation in the home that is in every way pleasurable, all this is of benefit. The patient must have an abundance of sleep—eight or ten hours during the night, while during the later stages of pregnancy she also must take a nap during the day whenever the inclination is strongest. Baths are of vital importance to a pregnant woman, but they should be neither too hot nor too cold, and should not be too greatly prolonged. Her own judgment and sensations must decide.

Advice About Hygienic and Medical Regimen

I am very much in favor of hot sitz-baths during the last three months of pregnancy. If the patient is of rigid and firm muscular fiber, a bath must, early in the term, be taken once in eight or ten days; but, if she is of relaxed and loose fiber and lacks muscular tone, they should be taken less often, should not be long continued, nor as hot. In extreme cases of relaxation, hot baths should be avoided entirely. However, only seldom have I seen that hot sitz-baths induced any other than desirable results.

The use of oil as an external application, for many women, is a source of comfort. Pure olive-oil may be applied over the abdominal muscles when they become very tight or when the skin over the pelvic structure is dry and harsh; the oil may be applied also to the thighs and the external parts freely. Also, if constipation is present or if there is sluggishness of the liver, with a tendency to slight discoloration of the conjunctivæ, olive-oil may be taken internally. The bowels may be relaxed with occasional doses of sodium phosphate, regularly given.

During the second stage of labor, application of compresses wrung from very warm oil or from hot water are very beneficial in dilating the perineum. Constipation should be overcome by simple measures. The use of liquid petrolatum, or paraffin-oil, is now being found serviceable, but active physics must be avoided. Laxatives must be selected with great care.

I believe that the blood pressure of every patient who is at all inclined to perversions of health during pregnancy should be ascertained once in two weeks, and as soon as 135 or 140 mm. is reached close watch should be kept upon the urine; then, if any evidences whatever of kidney complication appear, these must be met promptly and positively. The first of these indications is restlessness, then backache, slight headache, some insomnia. Violent measures are not justifiable, but the patient should be dieted carefully and watched closely.

For the backache, hot dry applications may be made by means of an ordinary hot-water bag, for a period of one to two hours, two or three times in twenty-four hours. The patient should be given gelsemium and macrotys, in fair physiological doses, every two hours. This, in my own practise, is the best combination that I have yet found for preventing kidney complication. Any irritation of the spinal column must be treated with bryonia, in addition to the above, and, if there is much tenderness upon pressure, an application should be made of kaolin plaster or some mild dehydrating agent, to promote the action of the remedies.

If under these measures blood pressure increases, the pulse becomes more rapid and hard, and the patient complains of persistent headache, she must have veratrum in 1-drop doses every two, three or four hours, sufficient to reduce the pulse rate to 65 per minute. This will do away with the headache and also increase the renal activity.

The same remedy—veratrum viride—also exercises a most remarkable antagonistic influence upon the toxins, preventing uremic poisoning more often than will any other one remedy of which we have knowledge. Not long ago we had an excellent illustration of the advantage of this remedy, in the case of a patient who once had had eclampsia, and whose sister, a few months before, had died of puerperal convulsions. I saw her one morning at the end of the fifth month of pregnancy. She was most despondent, confident of a fatal ending, although not usually a melancholy patient or one who anticipated trouble.

The edema was quite general, the pulse ran 120 and was very hard, although albumin in only a slight quantity was present in the urine; the characteristic headache was very pronounced; also, there was some liver complication, the patient being slightly jaundiced; there even was some muscular irritation, with considerable twitching of muscular fibers.

Almost the entire treatment of this patient consisted of veratrum in 1- or 2-drop doses, watched carefully. She received a light laxative, while macrotys in small doses for the muscular irritability and the soreness was given. She was dieted in line with the above suggestions, and all worry and anxiety was removed. In three weeks, the evidences of threatened uremia were gone. In four weeks, the patient's condition was normal, and it continued thus up till the time of confinement, which also was normal, and uneventful in every detail.

Other conditions must be met as they occur. These are general rules which you may apply to all patients in the same way. I have studied the symptoms with many other physicians, and we are agreed on the use of certain specific remedies which are found indicated occasionally and which seem to exercise a very favorable effect.

Macrotys and Mitchella as Specifics

Macrotys not only controls the muscular irritability, but it acts as a pure nerve sedative of a tonic character; which does away both with nerve and muscular irritation at once. Besides, as the remedy has a specific influence, directly exercised, over the entire reproductive function, it seems to modify every unfavorable condition that is apt to be present during labor.

Another excellent remedy is mitchella. The influence of this hardly can be defined, but, in combination with macrotys—we are confident—these two remedies do much for the muscular irritability. A result of this, to which we would call the reader's attention, is the fact that, when muscular contractions occur, either during the first or second stages, the patient experiences all sensation of contraction, but with but little, if any, pain. In many of my cases, there has been an *entire absence of pain from muscular contraction.*

Results Often Are Surprising, with Incidental Benefits

One of my cases, the wife of a U. S. senator, had suffered agonizing pain for five days and nights, with her first child, and threatened she would commit suicide before she would consent to pass through another labor with her second child.

She followed my directions carefully. On the morning of the confinement, the painless contractions began about 3 o'clock awakening her from a natural restful sleep. Later, tiny shooting pains appeared every thirty minutes until 8 o'clock, when I was called. The expulsive contractions were entirely painless. I took precisely the same course with this woman that we had taken with the one above described. I broke the water-sac at ten minutes after nine as soon as I could get ready, and the child was born with two expulsive pains, at nine thirty.

The most desirable result of this course is that the mother preserves the normal integrity and perfect functional operation of every organ in the body. She feels as well in an hour after confinement as she would feel at any time in normal health. It is most difficult to keep these patients in bed, because they feel so well and, yet, unlike practise at Freiburg, I insist upon the patient

remaining in bed for from eight to fourteen days, in order to preserve the integrity of the organs and promote normal involution. If the patient has previously suffered from prolapse, displacements, uterine irregularities, leucorrhea or other distressing difficulty, I expect these all to be greatly relieved by the confinement, and we are confident that the remedies used promote such a result most materially.

Furthermore, the health of the infant seems to be benefited also by this course. These babies seem to be hardy and robust and to preserve their health under more aggravations. Also, the mother is enabled usually to nurse them with a full supply of rich, nutritious milk.

It seems to me that this course is infinitely superior to other methods, inasmuch as artificial measures are not depended upon, but our entire reliance is placed upon natural conditions and upon the preservation of integrity of the organs and their normal functionating. If the Freiburg doctors and others adopting that course would give to their patients some remedy that would do away with undue muscular irritability, such as macrotys and mitchella, which would quiet their patients during pregnancy and relieve each individual condition, it seems to me they would have almost ideal results.

The Hyoscine and Morphine Combination a Great Aid

In this connection, I wish to say a word about the aid to be derived from a judicious resort to the hyoscine, morphine, and cactoid combination. I am confident that, given in small dosage, this valuable combination can be employed with the course of the general treatment which I have advised, so as to do away entirely with the irritable and painful conditions that occur so frequently in these cases. This combination can be so adjusted both to mother and child as to produce a smooth, consistent, quieting influence, entirely devoid of danger. With the conjoint use of the H-M-C and our method, we at once secure the greatest possible condition of comfort.